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N. Geoffrey Greenberg

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EXAMINER

HURLEY, SHAUN R

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UNITED STATES PATENT AND TRADEMARK OFFICE

**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Ex parte N. GEOFFREY GREENBERG

Appeal 2009-1544
Application 10/759,586
Technology Center 3700

Decided:¹ April 30, 2009

Before TONI R. SCHEINER, ERIC GRIMES, and FRANCISCO C.
PRATS, *Administrative Patent Judges*.

GRIMES, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 involving claims 1-3 and 7-14, all of the pending claims, which are directed to a two-ply sewing thread.

¹ The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the decided date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

The Examiner has rejected the claims as obvious. We have jurisdiction under 35 U.S.C. § 6(b). We reverse.

STATEMENT OF THE CASE

The Specification discloses a sewing thread “characterized by a high degree of twist that is imparted to each of the individual spun yarn strands compared to the degree of opposite twist imparted to the final ply twisted composite” (Spec. 2: 6-8). The disclosed thread is said to provide greater sewability and durability than conventional spun threads (*see id.* at 4: 17 to 5: 11).

Claims 1-3 and 7-14 are on appeal. Claim 1 is representative and reads as follows:

1. A 2-ply sewing thread comprising, in combination, at least one spun yarn ply twisted together with a second yarn in a first direction about each other along a common axis to form a ply twisted composite yarn, where the spun yarn contains 100% staple fibers, has a single twist equal to or greater than 4 more turns per inch than that of the plied twisted composite yarn, and is twisted in the opposite direction of the ply twisted composite yarn.

OBVIOUSNESS

Issue

The Examiner has rejected claims 1-3 and 7-14 under 35 U.S.C. § 103(a) as being obvious in view of Hatch² and Smith.³

The Examiner finds that Hatch discloses “a 2-ply yarn comprising two staple spun yarns of natural or synthetic fibers, the single yarns twisted in a

² Hatch, *Textile Science*, 1993, West Publishing Company, St. Paul, Minnesota, pg. 294.

³ Smith et al., US 2003/0226347 A1, Dec. 11, 2003.

direction opposite to that of the plied yarn” (Answer 3, citing Fig. 24.4 of Hatch). The Examiner also finds that Hatch does not “specifically teach a twist difference of greater than 4 tpi [turns per inch],” but that Smith discloses this aspect (*id.*, citing ¶ 29 of Smith). The Examiner concludes that it “would have been obvious to one of ordinary skill in the art ... to utilize such a tpi, so as to achieve the composite benefits of both a hard twist yarn, and a soft twist yarn” (*id.*).

Appellant contends that the Examiner erred in concluding that the combined references suggest that the spun yarn has a “twist of at least 4 turns per inch more than the level of twist imparted in the ... plied composite” (Appeal Br. 3).

The issue presented is: Does the evidence of record support the Examiner’s conclusion that the cited references suggest a 2-ply sewing thread including a spun yarn ply that “has a single twist equal to or greater than 4 more turns per inch than that of the plied twisted composite yarn?”

Findings of Fact

1. Hatch discloses that single yarns are made of twisted staple fibers and that plied yarns are made of two or more single yarns that are twisted together (Hatch 294).
2. Hatch discloses that the “direction of twist usually alternates with each successive step in forming the ultimate yarn” (*id.*).
3. Hatch discloses that “[m]ost sewing thread has a plied-yarn construction” (*id.*).
4. Smith discloses a “synthetic rope for an elevator having improved resistance to compression and abrasion” (Smith, ¶ 0010)

5. Smith discloses that the rope “comprises a plurality of helically laid strands, each strand formed from a plurality of helically laid pre-twisted substrands” and that the “term ‘pre-twisted substrands’ means that each substrand is composed of a plurality of yarns that have been combined by utilizing one or more twisting steps” (*id.*).

6. Figure 2B of Smith is shown below:

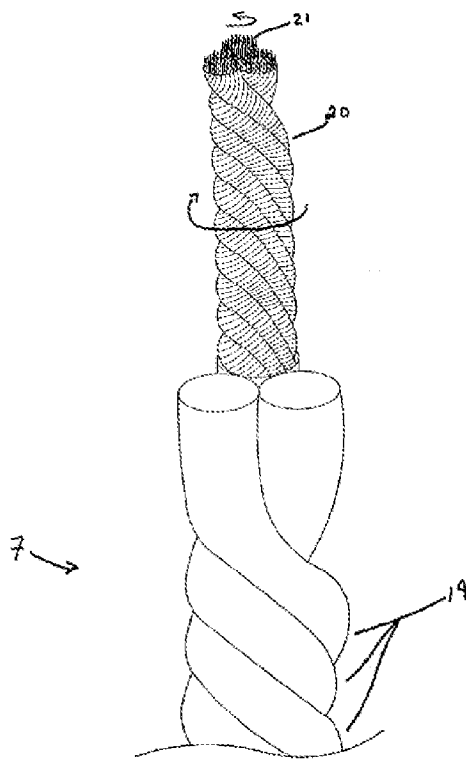


FIG. 2B

Figure 2B shows “an enlarged perspective view of a strand ... made from three pre-twisted substrands, each of which is made from three yarns composed of synthetic filaments” (*id.* at ¶ 0016).

7. Smith discloses that

strand 7 is constructed from three pre-twisted substrands 19. Each substrand 19 is formed as follows. Three yarns 20 are individually formed from a multiplicity of continuous filaments

21. Each yarn **20** is twisted about its longitudinal axis at between 1 and 6 turns per inch (tpi), and preferably between 2 and 4 tpi, in a counterclockwise direction (denoted by the smaller arrow). The three twisted yarns **20** are then twisted together at the same number of turns per inch in a clockwise direction (denoted by the larger arrow). Alternatively, substrands **19** can be formed in a single twisting step by twisting together all yarns in the substrand in a clockwise direction at between 1 and 6 tpi, and preferably between 2 and 4 tpi. The amount of turns per inch in the twisting will vary proportionately smaller or larger depending on the diameter of the particular yarns, substrands, and strands being constructed.

(*Id.* at ¶ 0029.)

Principles of Law

“In rejecting claims under 35 U.S.C. § 103, the examiner bears the initial burden of presenting a *prima facie* case of obviousness. Only if that burden is met, does the burden of coming forward with evidence or argument shift to the applicant.” *In re Rijckaert*, 9 F.3d 1531, 1532 (Fed. Cir. 1993).

“In determining whether obviousness is established by combining the teachings of the prior art, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.” *In re GPAC Inc.*, 57 F.3d 1573, 1581 (Fed. Cir. 1995) (internal quotations omitted).

Analyzing obviousness under 35 U.S.C. § 103 requires “a searching comparison of the claimed invention – including all its limitations – with the teaching of the prior art.” *In re Ochiai*, 71 F.3d 1565, 1572 (Fed. Cir. 1995).

Analysis

Claim 1, the only independent claim, is directed to a 2-ply sewing thread comprising a spun yarn ply twisted together with a second yarn. Claim 1 also requires the spun yarn to have a single twist at least 4 more turns per inch than that of the plied twisted composite yarn.

Appellant argues that the cited references do not suggest this limitation:

Hatch teaches that there should be no significant difference between the turns per inch (“tpi”) of individual yarns and the tpi in the opposite direction of the plied composite. ... Smith is completely consistent with Hatch in teaching that the level of twist of the plied composite should be “twisted together at the same number of turns per inch” in the opposite direction.

(Appeal Br. 4.)

The Examiner responds that Smith suggests the disputed limitation because, “in paragraph 29, if the substrands are twisted together at 6 tpi, without twisting them beforehand (see paragraph 29, lines 13-16), then there most certainly will be a twist differential of greater than 4 tpi” (Answer 4).

Appellant’s arguments are persuasive. Smith discloses that substrand 19 of strand 7 are formed in one of two ways: (i) by twisting continuous filaments 21 counterclockwise at 1-6 tpi into separate yarns 20, and then twisting yarns 20 clockwise “at the same number of turns per inch” (Smith, ¶ 0029) to form substrand 19 or (ii) by twisting all of the continuous filaments clockwise at 1-6 tpi to form substrand 19, without the intermediate formation of separate yarns 20.

The Examiner’s argument appears to be that if the substrand 19, made by the second method described above, are twisted together at 6 tpi to

form strand 7, but the substrands 19 are not twisted beforehand, then strand 7 will have a twist at least 4 tpi greater than substrand 19. Smith expressly teaches, however, that substrands 19 are twisted before being combined to form strand 7, regardless of which of the two described methods is used. That is, Smith teaches that the substrands can be made by twisting together yarns that were previously made by twisting filaments, or the substrands can be made in a single twisting step. In both methods, however, the substrands are twisted at 1-6 tpi.

Alternatively, the Examiner's position may be that if Smith's continuous filaments 21 are twisted together at 6 tpi to form substrand 19 (i.e., the second embodiment), substrand 19 will have a twist differential of greater than 4 tpi compared to the individual filaments. That is, the Examiner may be arguing that substrand 19 would have a greater tpi than the individual yarns or filaments 21. However, the claim specifies the reverse; it requires that the individual yarns or filaments (i.e., the spun yarn) has a greater tpi than the plied yarn.

Thus, the Examiner has not adequately explained how the cited references would have suggested the claim limitation of a spun yarn component that "has a single twist equal to or greater than 4 more turns per inch than that of the plied twisted composite yarn." The rejection of claim 1 is reversed. Claims 2, 3 and 7-14 depend from claim 1, and the rejection of these claims is reversed for the same reason.

CONCLUSIONS OF LAW

The evidence of record does not support the Examiner's conclusion that the cited references suggest a 2-ply sewing thread including a spun yarn

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ply that “has a single twist equal to or greater than 4 more turns per inch than that of the plied twisted composite yarn.”

SUMMARY

We reverse the rejection 1-3 and 7-14 under 35 U.S.C. § 103(a) as being obvious in view of Hatch and Smith.

REVERSED

dm

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